MICROFLUIDIC LARGE SCALE INTEGRATION

ABSTRACT OF THE DISCLOSURE

High-density microfluidic chips contain plumbing networks with thousands of micromechanical valves and hundreds of individually addressable chambers. These fluidic devices are analogous to electronic integrated circuits fabricated using large scale integration (LSI). A component of these networks is the fluidic multiplexor, which is a combinatorial array of binary valve patterns that exponentially increases the processing power of a network by allowing complex fluid manipulations with a minimal number of inputs. These integrated microfluidic networks can be used to construct a variety of highly complex microfluidic devices, for example the microfluidic analog of a comparator array, and a microfluidic memory storage device resembling electronic random access memories.